

# Develop High Efficiency Liquid-Feed PEM Electrolyzer Based on Integrated Flow Field (IFF) Structure, Phase I

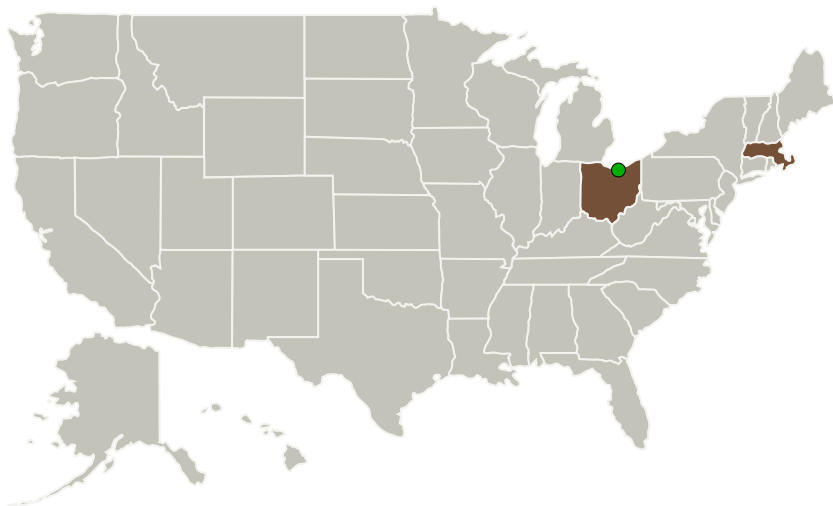
Completed Technology Project (2011 - 2011)



## Project Introduction

Polymer electrolyte membrane water electrolysis units are currently designed to require active water flow and phase separation, or are based on a passive vapor transport mechanism that inherently limits performance due to mass-transport limitations. ElectroChem has developed and successfully demonstrated a passive water transport Integrated Flow Field concept (its IFF Structure) that controls the flow of water through each cell, in a highly reliable, performance enhancing, and gravity independent manner. By enabling the passive transport of liquid water to and from the membrane, it simplifies the structure of the electrolyzer system while avoiding performance limits due to mass transfer problems that have plagued conventional electrolyzers. ElectroChem will develop a high performance electrolysis unit that is based on the passive transport of liquid water into, within, and out of the cell. A custom-designed IFF cell structure will be developed during Phase I to refine approaches to optimized performance under a wide range of conditions, including gravity independence, higher current, and prolonged-period stable operation. The Phase II program will focus on multi-cell stack development and higher pressure modifications in support of energy storage systems free of mechanical compressors and water circulation pumps.

## Primary U.S. Work Locations and Key Partners



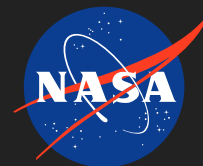
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Organizations Performing Work	Role	Type	Location
ElectroChem, Inc.	Lead Organization	Industry Minority-Owned Business, Women-Owned Small Business (WOSB)	Woburn, Massachusetts
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

## Primary U.S. Work Locations

Massachusetts	Ohio
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## Project Transitions

**February 2011:** Project Start

**August 2011:** Closed out

### Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138084>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

ElectroChem, Inc.

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

### Principal Investigator:

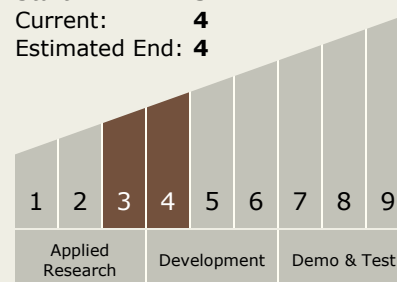
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## Technology Maturity (TRL)

Start: **3**

Current: **4**

Estimated End: **4**



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## Technology Areas

### Primary:

- TX07 Exploration Destination Systems
  - └ TX07.1 In-Situ Resource Utilization
    - └ TX07.1.3 Resource Processing for Production of Mission Consumables

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System